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MAKING MORBIDITY RECORDS AID THE EPIDEMIOLOGIST.

By FRANK L. KELLY, M. D., Epidemiologist, and IDA MAY STEVENS, M. A. (P. H.), Assistant Epidemiologist, Bureau of Communicable Diseases, California State Board of Health.

The Bureau of Communicable Diseases of the California State Board of Health has developed a system of utilizing morbidity records to call to the attention of the epidemiologists any undue prevalence of disease. In a unit as large as a State, not only the actual number and distribution of cases and the relation of the current incidence to that of the past should be shown, but there should be some means of continually keeping those localities that are running a higher rate than normal before the attention of the epidemiologists. This is done in California by the use of endemic curves, "index maps," spot maps, and card records.

1. *Endemic curves.*—The chief function of a health department is to lower the morbidity and mortality from the different communicable diseases. It is therefore more important to know that the total number of cases reported for the year up to a given time is above or below the total normally reported up to the same time than it is to know that the number reported for any one week or month is above or below that normally reported for the same week or month.

For the above reason, instead of establishing a monthly endemic index for the different diseases, as devised by Brown (1), a normal endemic cumulative curve of each disease was plotted for each county in the State. Assuming, as did Brown, that the average of the preceding five years would give a fairly accurate index of the normal, the endemic cumulative curves were plotted by taking the average of the monthly reports, exclusive of epidemics, for the preceding five years. In constructing these curves, averages proved much more practical than medians, as suggested by Hitchcock and Carey (2). In such small units as counties, the variation in the weekly reports is so great that averages give a much more accurate index than medians, which are only of use where a large series of numbers in which the variation is not great is available.

The reports from the local health officers are sent in weekly. When all of the reports from a county have been received for the

week they are totaled, and the result is plotted in a cumulative curve, by weeks, on the same sheet with the endemic curve. Whenever the current curve rises above the endemic curve it shows that the disease has become more prevalent than normal, and this fact is immediately brought to the attention of the epidemiologists. In order that a community that has run consistently below the normal



FIG. 1.

may not have an outbreak of a disease unnoticed, even though this outbreak may not carry the total cases above the normal, any sudden rise of the current cumulative curve is called to the attention of the chief of the division.

On the same sheet with the endemic and current curves is the cumulative curve, by weeks, for the preceding year. In this way

2. *Index maps.*—In order that it may be seen at a glance just which communities are above the normal, an "index map" of the State is kept for each disease. Whenever the current cumulative curve of a



county rises above the endemic curve on the chart described above, a red thumb tack is placed in the corresponding county on the map, and whenever the current curve rises above that of the preceding year a colored round headed pin is used. If the county remains above the normal for another week, the red tack is replaced by one of another color, a different color being used for each disease. This

brings out in a very striking manner the counties which have just exceeded the normal. Should the current curve later drop below the endemic curve or the curve for the preceding year, the thumb tacks or the pins are withdrawn. In this way it is possible to see at any time which counties are running above the normal and just where more intensive work is needed if the State rate is going to be lowered. Figure 1 shows the typhoid "index map" for 1919, and Figure 2 the smallpox map. Typhoid, it will be seen, went above the normal in 12 counties, and smallpox above in 38.

3. *Spot maps*.—Ordinary spot maps are kept in order to show the actual number and distribution of cases, a separate map and different-colored pins being used for each disease. In order to show the current distribution, quarterly, as well as annual, maps are kept. After a map is from 4 to 6 months old it is of no value in showing current distribution, for it is impossible to tell which are the current cases. By using a map for each quarter not only the current distribution is shown fairly accurately but also the seasonal distribution of a disease can be followed. Pins of three sizes are used; the smallest size is used for single cases, the next size for 5 cases, and the largest for 25 cases. The pins used on the spot maps correspond in color to the tacks used on the index maps, except as noted above.

These two sets of maps show the actual distribution and incidence of cases throughout the State and, what is more important, whether or not each county has fewer cases than normally, and whether the number is above or below that for the preceding year.

4. *Card records*.—A set of cards is kept for each locality in the State and is filed by counties. On these cards can be entered the number of cases reported each week for a period of eight years. This gives a ready comparison by weeks for a long period of time. By going over the cards for each city and town in a county which has run above the normal, the exact place can be located where immediate measures are necessary to control the spread of the disease.

While the system may seem somewhat complex, it is really very simple in operation, for the only added feature over the ordinary system of comparison by cumulative curves is the "index map," and it is this map that makes the whole system easy to follow without the necessity of constantly referring to curves and record cards.

An illustration of the actual working of the system is as follows: The current cumulative typhoid curve for "X" County rose above the endemic curve during the fourth week of June, 1919 (Fig. 3). At this time a red thumb tack was placed on the "index map" for this county. In order to find the distribution of cases in the county, the spot map was referred to and showed 1 case at A, 3 at B, 71 at C, 1 at D, 15 at E, 1 at F, 1 at G, and 1 in the rural districts under the supervision of the county health officer. When the cards for the

different cities and towns were looked over, it was found that the disease was unduly prevalent at E, and an epidemiologist was immediately sent to investigate conditions and recommend control measures.

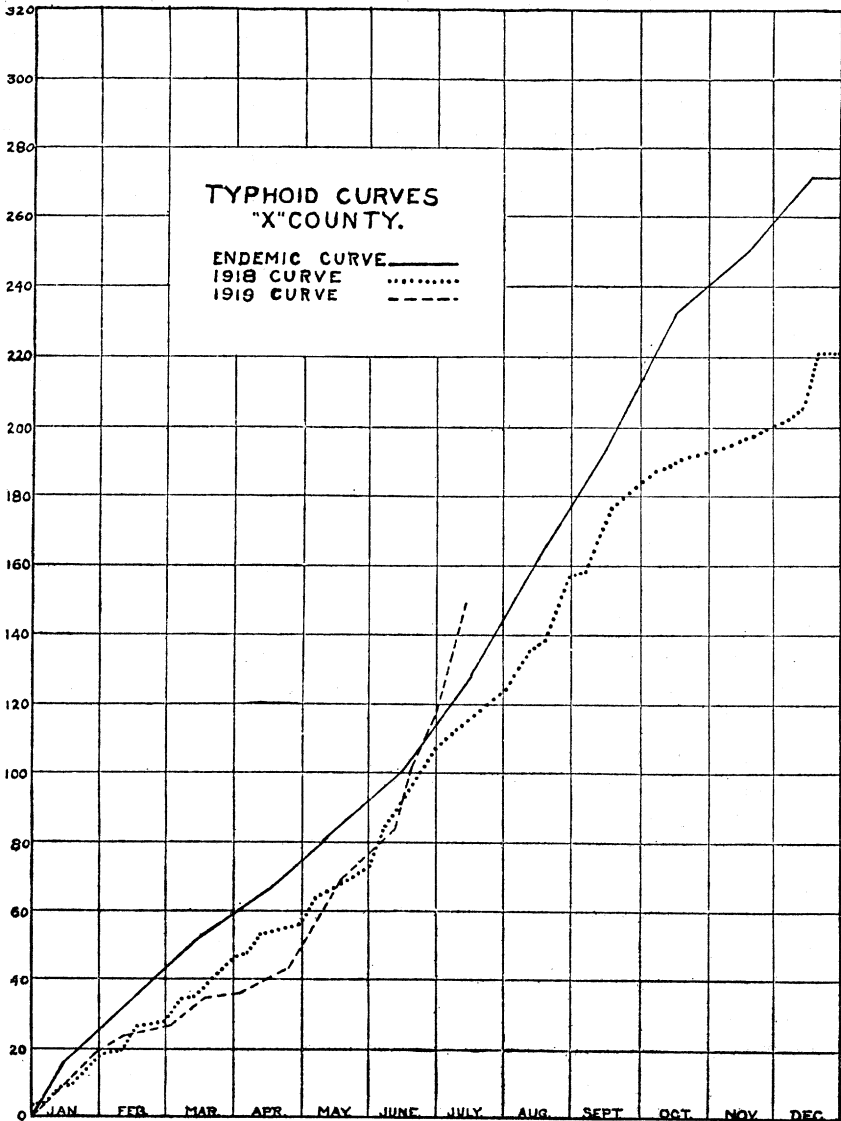


FIG. 3.

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2. Hitchcock, J. S., and Carey, B. W.: Am. Jour. Public Health, vol. 9, p. 355.